Serial No.	H-A003-E-11

Ball Valve Type 21・21α Pneumatic Actuated Type AA

User's Manual

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ASAHI AV VALVES

This user's guide contains very important information for the proper installation, maintenance and safe use of an ASAHI AV Product. Please store this manual in an easily accessible location.

<Warning & Caution Signs>

Warning	This symbol reminds the user to take caution due to the potential for serious injury or death.
Caution	This symbol reminds the user to take caution due to the potential for damage to the valve if used in such a manner.

<Prohibited & Mandatory Action Signs>

	Prohibited: When operating the valve, this symbol indicates an action that should not be taken.
	Mandatory action: When operating the valve, this symbol indicates mandatory actions that must be adhered to.

(1)Be sure to read the following warranty clauses of our product

- Always observe the specifications of and the precautions and instructions on using our product.
- We always strive to improve product quality and reliability, but cannot guarantee perfection. Therefore, should you intend to use this product with any equipment or machinery that may pose the risk of serious or even fatal injury, or property damage, ensure an appropriate safety design or take other measures with sufficient consideration given to possible problems. We shall assume no responsibility for any inconvenience stemming from any action on your part without our written consent in the form of specifications or other documented approval.
- The related technical documents, operation manuals, and other documentation prescribe precautions on selecting, constructing, installing, operating, maintaining, and servicing our products. For details, consult with our nearest distributor or agent.
- Our product warranty extends for one and a half years after the product is shipped from our factory or one year after the product is installed, whichever comes first. Any product abnormality that occurs during the warranty period or which is reported to us will be investigated immediately to identify its cause. Should our product be deemed defective, we shall assume the responsibility to repair or replace it free of charge.
- Any repair or replacement needed after the warranty period ends shall be charged to the customer.
- The warranty does not cover the following cases:
  (1) Using our product under any condition not covered by our defined scope of warranty.
  (2) Failure to observe our defined precautions or instructions regarding the construction, installation, handling, maintenance, or servicing of our product.
  (3) Any inconvenience caused by any product other than ours.
  (4) Remodeling or otherwise modifying our product by anyone other than us.
  (5) Using any part of our product for anything other than the intended use of the product.
  (6) Any abnormality that occurs due to a natural disaster, accident, or other incident not stemming from something inside our product.

(2) General operating instructions

Warning

- Do not disassemble or modify the actuator.
  (If disassembled forcible, internal parts may jump out and this is very dangerous.)
- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas is under similar pressures used for liquids. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use a gas in testing, please consult your nearest service station beforehand.
- Certain liquid such as H2O2, NaClO, etc may be prone to vaporization (Off-Gassing) which may cause irregular pressure increases, which may destroy the valve.

Caution

- Do not step on or apply excessive weight on valve. (It can be damaged.)
- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)
- Do not use AV valves in a place where they may become submerged in water.
- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Do not use the valve in conditions where the fluid may have crystallized.
  (The valve will not operate properly.)
- Keep the valve away from excessive heat or fire. (It can be damaged, or destroyed.)
- Always operate the valve within the pressure vs. temperature range.
  (The valve can be damaged or deformed by operating beyond the allowable range.)
- Allow sufficient space for maintenance and inspection.
- Select a valve material that is compatible with the media. For chemical resistance information, refer to "CHEMICAL RESISTANCE ON ASAHI AV VALVE".
  (Some chemicals may damage incompatible valve materials.)
- Keep the valve out of direct sunlight, water and dust. Use cover to shield the valve.
  (The valve will not operate properly.)
- Perform periodic maintenance. (Leakage may develop due to temperature changes or changes with time during prolonged storage, rest, or operation.)
- Set valve support on the valve.
- The AV valves must be used within the specifications specifically applicable to the Product.
- If the actuator is used in an environment below 5℃ temperature, its operating fluid must be free from the water and moisture contained in it because of possible problems due to the freeze.
- The operating fluid must be clean air filtered through a pertinent air filter.

(3) General instructions for transportation, unpacking and storage

Warning

- When suspending and supporting a valve, take care and do not stand under a suspended valve.

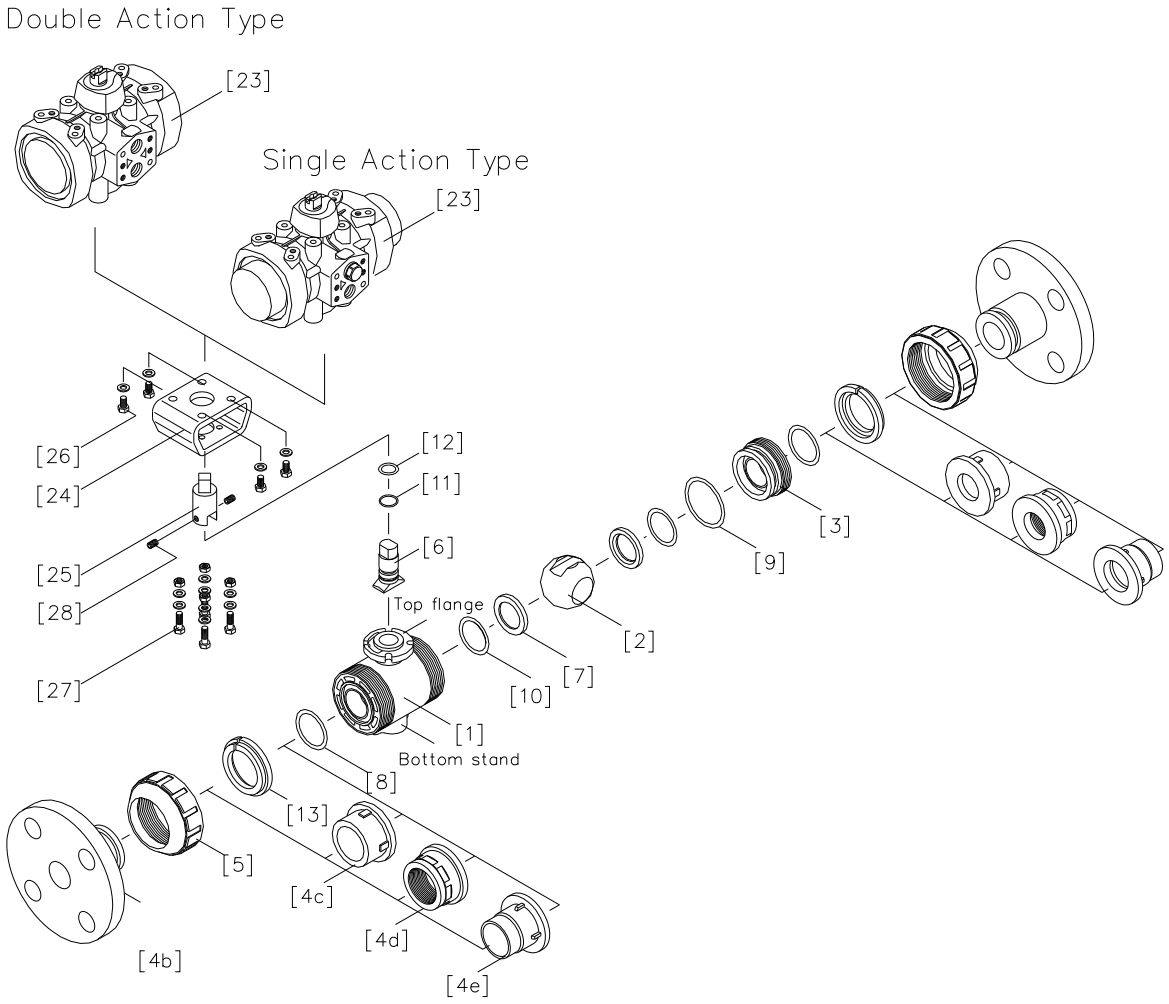
Caution

- This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.
- Do not over-stack cardboard shipping boxes. Excessively stacked packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
  (The force of swelling may damage the valve.)
- When transporting a valve, do not carry it by the handle.

- Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

(4) Name of parts

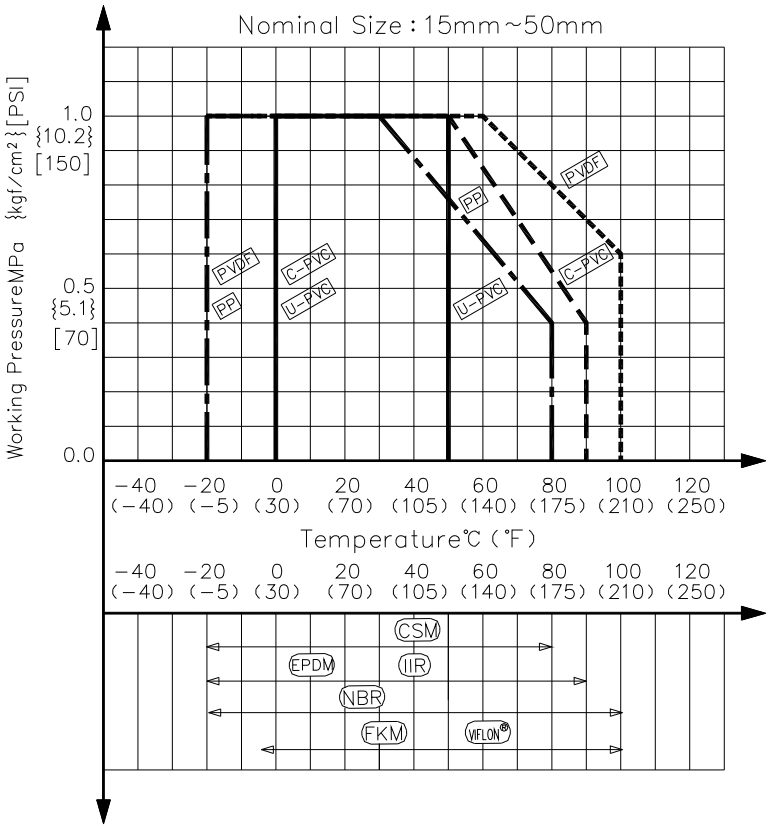
Nominal size 15-50mm (1/2”-2”)



[1]	Body *	[6]	Stem *	[23]	Actuator
[2]	Ball *	[7]	Seat *	[24]	Stand
[3]	Carrier *	[8]	O-ring (A)	[25]	Joint
[4b]	End connector (Flanged end type)	[9]	O-ring (B) *	[26]	Bolt (A)
[4c]	End connector (Socket end type)	[10]	O-ring (C) *	[27]	Bolt-nut (B)
[4d]	End connector (Threaded end type)	[11]	O-ring (D)	[28]	Screw (B)
[4e]	End connector (Spigot end type)	[12]	O-ring (E)		
[5]	Union nut	[13]	Stop ring		

* Type 21 and 21α have not all same parts to male one complete.
As for details, please consult your nearest service station beforehand.

(5) Working pressure vs. temperature



(6) Specifications of valve body

*Specification of Type 21 & Type 21α

Nominal size	Body material			
	PVC	C-PVC	PP	PVDF
15-50mm (1/2"-2")	Type21α		Type21	

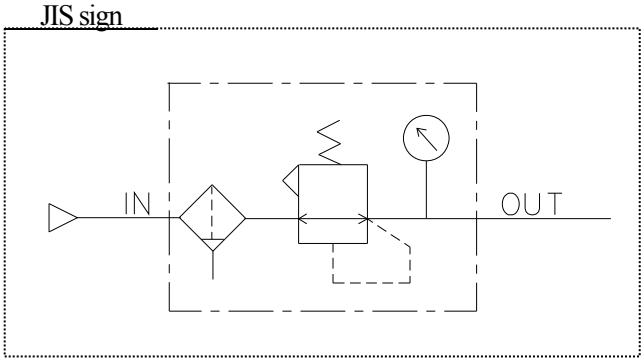
(7) Specifications of actuator

Actuation	Nominal Size	Actuator name	Angle adjustment range	Standard operating pressure MPa {kgf/cm^2}	Air consumption N l per 1 open and close (at 0.4MPa)	Air supply bore
Double Action Type	15-32mm (1/2"-1 1/4")	PPW	Unable to adjust	0.4 {4.1}	0.6	Rc 1/8
	40, 50mm (1 1/2", 2")	PP00	Unable to adjust	0.4 {4.1}	1.2	Rc 1/4
Single Action Type	15-32mm (1/2"-1 1/4")	PP00S	Unable to adjust	0.4 {4.1}	0.7	Rc 1/4
	40, 50mm (1 1/2", 2")	PP10S	Unable to adjust	0.4 {4.1}	1.7	Rc 1/4

(8) Specification of pressure reducing valve with filter (option)

Actuation	Nominal size	Type sign	Pipe bore	Element degree of filtration
Double actuation Type	15-50mm (1/2"-2")	ARU2-0208A-B	Rc 1/4	5 μ m
Air to open Type & Air to shut Type	15-50mm (1/2"-2")			

JIS sign



(9) Specification of solenoid valve (option)

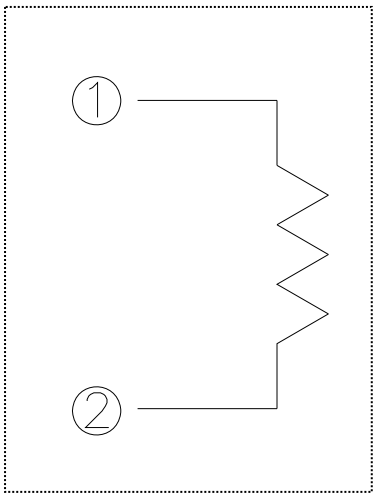
Actuation	Nom. size	Type sign	Pipe bore	Effective cross section area	Power consumption	Additional function
Double actuation Type	15-50mm (1/2"-2")	4N3S102K-W□-G31193	Rc 1/4	10mm^2 or more	AC ; 6VA DC ; 5.5W	○Bypass valve built – in ○Silencer with needle valve attached (to be used as speed controller)
Air to open & Air to shut						

4N3S102K-W□-G31193

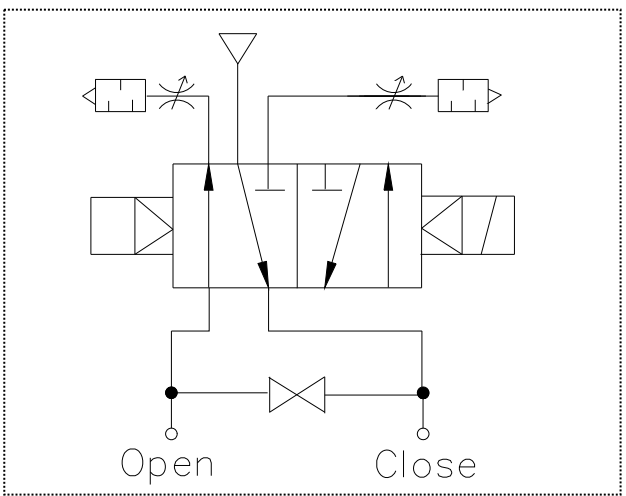
Specification	sign
AC100V 50/60Hz	1
AC110V 50/60Hz	(2)
AC200V 50/60Hz	3
AC220V 50/60Hz	(4)
DC24V	5
DC48V	(6)
DC100V	(7)
DC125V	(8)
DC110V	(9)

※ ( )is special order。

connection diagram



JIS sign



(10) Specifications of limit switch (option)

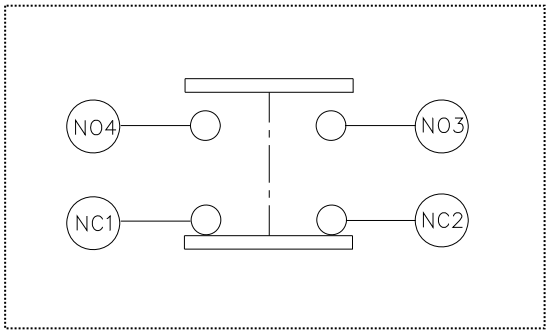
＜1LS1-J＞

Actuation	Nom. size	Type sign	Protection grade
Double actuation Type	15-50mm (1/2”-2”)	1LS1-J	IP67 (IEC529)
Air to open & Air to shut		1LS1-J	IP67 (IEC529)

Limit switch rating

Rate voltage (V)	resistive load (A)	Inductive load (A)
AC125	10	6
AC250	10	6
DC115	0.8	0.2
DC230	0.4	0.1

Connection diagram (At intermediate opening)



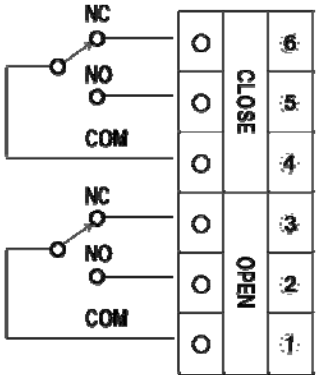
＜CFC-6301, CFC-6302＞

Actuation	Nom. size	Type sign	Switch contact	Protection grade
Double actuation Type	15-50mm (1/2”-2”)	CFC-6301	Silver contacts	IP67(IEC529)
		CFC-6302	Gold contacts (Minute load specification)	
Air to open & Air to shut	15-50mm (1/2”-2”)	CFC-6301	Silver contacts	IP67(IEC529)
		CFC-6302	Gold contacts (Minute load specification)	

Limit switch rating

Type sign	Rate voltage (V)
CFC-6301	AC250
	DC24
CFC-6302	AC250
	DC24

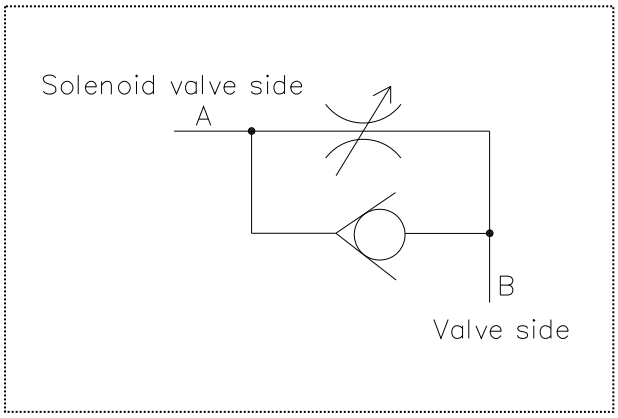
Connection diagram



(11) Specification of speed controller (option)

Actuation	Nom. size	Type sign	Pipe bore	Effective cross section area (mm^2)		Needle No. of revolution
				Free flow	Control flow	
Double actuation Type Air to open & Air to shut	15-50mm (1/2"-2")	SC7-08A	Rc 1/4	11	8.3	8 turns

JIS sign



(12) Installation procedure

Warning

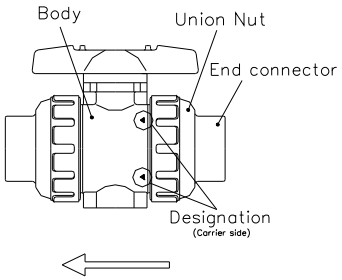
- When suspending and supporting a valve, take care and do not stand under a suspended valve.

- Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)

Caution

- When installing a pipe support by means of a U-band or something similar, take care not to over-tighten. (Excessive force may damage the pipe.)
- Do not use the pipe wrench. (The Valve can be damaged)

- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
- When installing a piece of equipment at the end of the piping line, be sure to keep the secondary (Downstream) End Connector and Union Nut installed on the valve.
- When installing valve, at the end, note the direction of flow. (Find the mark ◀ molded on the Carrier-side body. On the secondary (Downstream) side, the Carrier is integral with the valve body. This is the preferred method if installation when installing the equipment at the end of the line for safety purposes.)



- When loosening the union nut on the union side, fix the body cap (hold it with your hand) and do work. (If the body cap turns, the union will turn together, resulting in the union and ball separating from the body.) If the union is loosened, retighten the union.
- When installing, disassembling, or reassembling the piping, fix the End Connector.
- Before a water test, be sure that the Union Nut is tightly fastened.
- Fasten the Union Nut while avoiding the parallelism and axial misalignment of the flange surface.
- When connecting an ASAHI AV Valve to metal piping, take care not to let the pipe stress on the ASAHI AV Valve.
- When screwing in a Metal Insert (Ensat), install it vertically. Refer to the User's Manual for Metal Insert (Ensat) by the Maker.
- Take care not to over-tighten the Union Nut. (The valve can be damaged.)

Flanged End (Material: PVC, C-PVC, PP, PVDF)

Caution
- Use flat faced flanges for connection to AV Valves.
- Ensure that the mating flanges are of the same standards.
- Be sure to use sealing gaskets (AV Gasket), bolts, nuts, and washers and tighten them to specified torques. (When a non-AV gasket is used, a different tightening torque specification should be followed.)

Necessary items
- Torque wrench
- Spanner wrench
- AV gasket
- Bolt, Nut, Washer (For many flanges specification)

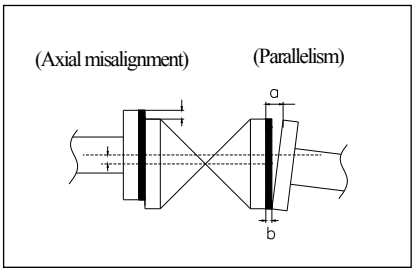
Procedure

1) Set the AV gasket between the flanges.

2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.

Caution
- The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve. (A failure to observe them can cause destruction due to stress application to the pipe)

Nom. Size	Axial Misalignment	Parallelism (a-b)
15-32mm (1/2”-1 1/4”)	1.0mm (0.04”)	0.5mm (0.02”)
40-50mm (1 1/2”-3”)	1.0mm (0.04”)	0.8mm (0.03”)



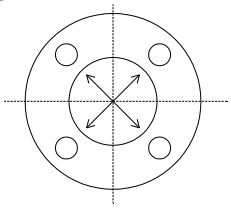
3) Using a torque wrench, tighten the bolts and nuts gradually to the specified torque in a diagonal manner. (Refer to Fig.1.)

Caution
- Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner.

Recommended torque value Unit: N·m{kgf·cm}[lb·inch]

Nom. Size	15-20mm (1/2”-3/4”)	25-40mm (1”-1 1/2”)	50 mm (2”)
PTFE･PVDF coated	17.5{179}[155]	20.0{204}[177]	22.5{230}[230]
Rubber	8.0{82}[71]	20.0{204}[177]	22.5{230}[230]

Fig. 1



*Be sure to set the union nut [5] when it was removed or loosen from body [1].

1) The O-ring (A) [8] should be set on surface of the end connector [4b].

2) The end connector [4b] must be put onto the carrier, then ensure that the o-ring (A) [8] is being between the end connector [4b] and the carrier.

3) Tighten up the union nut [5] hardly with hand.

4) Screw the union nut [5] on the body [1] by quarter or half turn using a strap wrench without damaging it.

Threaded End (Material : PVC, C-PVC, PP, PVDF)

Caution

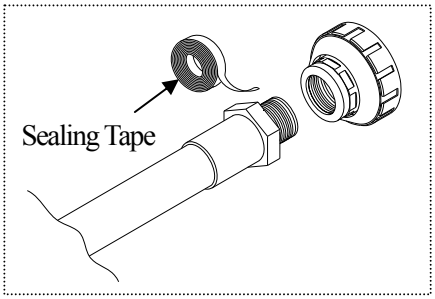
- Avoid excessive tightening. (The valve can be damaged.)
- Make sure that the threaded connections are plastic x plastic. (Metallic thread can cause damage.)
- Wrap the threaded joints on our plastic piping with sealing tape. Using a liquid sealing agent or liquid gasket may cause stress cracks (Environmental Stress Cracking). Our product warranty shall not apply in case of said use, even when said use is unavoidable.

Necessary items

- Sealing tape
- Strap wrench
- Spanner wrench

Procedure

1) Wind a sealing tape around the external thread of joint, leaving the end (about 3mm) free.



2) Loosen the union nut [5] with a strap wrench..

3) Remove the union nut [5] and the end connector [4d].

4) Tighten the external thread of the joint and the end connector [4d] hardly with hand.

5) Using a spanner wrench, screw in the end connector [4d] by turning 180 °-360 ° carefully without damaging it.

6) Make sure that the O-ring (A) [8] is mounted.

7) Set the end connector [4d] and union nut [5] directly on the body without allowing the O-ring (A) [8] to come off.

8) Tighten the union nut [5] hardly with hand.

9) Using a strap wrench, screw it in by turning 90 °-180 ° carefully without damaging it.

Socket End (Material : PVC, C-PVC)

Warning
- When using an adhesive, ventilate the space sufficiently, prohibit the use of a fire in the vicinity, and do not inhale adhesive vapors directly.
- If an adhesive gets into contact with your skin, wash it off immediately. If you feel sick or find any anomaly, receive a physician's diagnosis and take appropriate measures promptly.

Caution
- Take care in doing work at low temperatures. Solvent vapors are hard to evaporate and are likely to remain. (Solvent cracks may occur, damaging the equipment.) After assembling the piping system, open both ends of the piping and use a fan (of the Low-Voltage Type) or something similar to ventilate the space, thus removing the solvent vapors.
- Use the appropriate Asahi AV cement.
- Conduct a water test at least 24 hours after joining the pipes with an adhesive/cement.

Necessary items
- Adhesive for hard vinyl chloride pipes
- Strap wrench

Procedure

1) Loosen the union nut [5] with a strap wrench.

2) Remove the union nut [5] and end connector [4c].

3) Lead the union nut through the pipe.

4) Clean the hub part of the end connector [4c] by wiping the waste cloth.

5) Apply adhesive evenly to the hub part of the end connector [4c] and the pipe spigot.

Caution
- Do not apply more adhesive than necessary. (The valve can be damaged due to solvent cracking.)

Adhesive quantity (guideline)

Nom. Size	15mm (1/2")	20mm (3/4")	25mm (1")	32mm (1 1/4")	40mm (1 1/2")	50mm (2")
Quantity(g)	1.0	1.3	2.0	2.4	3.5	4.8

6) After applying adhesive, insert the pipe quickly to the end connector [4c] and leave it alone for at least 60 seconds.

7) Wipe away overflowing adhesive.

8) Make sure that O-ring(A) [8] is mounted

9) Set the end connector [4c] and union nut [5] directly on the body without allowing the O-ring (A) [8] to come off.

10) Tighten the union nut [5] on each valve until hard tight.

11) Using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turns.

Socket End (Material : PP, PVDF)

Necessary items

- Strap wrench
- Sleeve welder or automatic welding machine
- User's manual for sleeve welder or automatic welding machine

Procedure

1) Loosen the union nut [5] with a strap wrench.

2) Remove the union nut [5] and the end connector [4c].

3) Lead the union nut [5] through the pipe.

4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.

5) After welding, make sure that the O-ring (A) [8] is mounted.

6) Set the end connector [4c] and the union nut [5] directly without allowing the O-ring (A) [8] to come off.

7) Tighten union nuts [5] on each valve until hand tight.

8) Using a strap wrench tighten union nuts uniformly on each side approx 90° -180° turns, 1/4 to 1/2 turn.

Spigot End (Material : PP, PVDF)

Necessary items

- Strap wrench
- Sleeve welder or automatic welding machine
- User's manual for sleeve welder or automatic welding machine

Procedure

1) Loosen the union nut [5] with a strap wrench.

2) Remove the union nut [5] and the end connector [4c].

3) Lead the union nut [5] through the pipe.

4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.

5) After welding, make sure that the O-ring (A) [8] is mounted.

6) Set the end connector [4c] and the union nut [5] directly without allowing the O-ring (A) [8] to come off.

7) Tighten the union nut [5] hardly with hand.

8) Using a spanner wrench, screw in the end connector [4d] by turning 180°-360° carefully without damaging it.

(13) Support setting procedure

Caution - Set valve support on the valve.

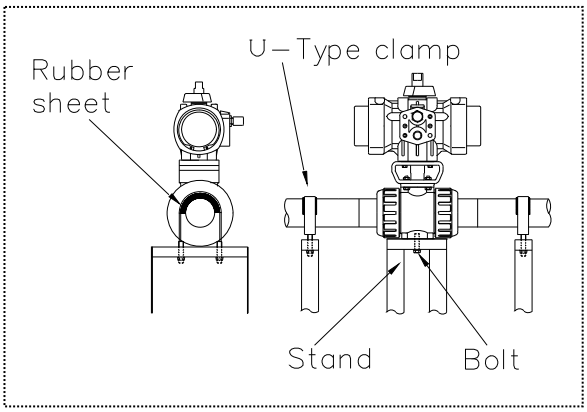
Necessary items
- Spanner wrench
- U-type clamp (with bolt)

Level installation

○Using metal insert (Ensat) & U-type clamp

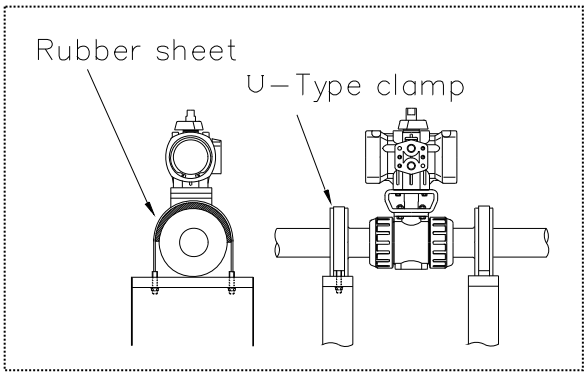
Fix the installation jig (under the valve) and stand with bolts (Refer to page 24)

Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



○Using U-type clamp (Only Flanged type)

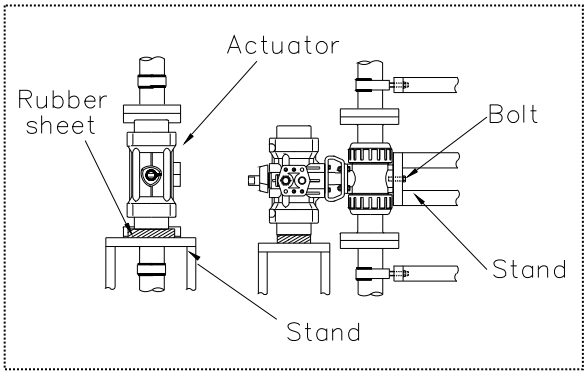
Spread the rubber sheet on the flanged part of pipe and secure pipe with U-type clamp.



Perpendicular installation

Fix the installation jig (under the valve) and stand with bolts (Refer to page 24)

Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



(14) Air piping procedure

<1>For a standard type and an attached speed controller type

Caution

- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- Do not apply a sealant excessively lest it fall off in the pipeline when an actuator is piped.
- Check the connection locations, air pipe sizes, and screw types with the approved drawings and other documents for the product. Then lay the air piping.
- The operating fluid must be clean air filtered through a pertinent air filter.
- If the actuator is used in an environment below 5℃ temperature, its operating fluid must be free from the water and moisture contained in it because of possible problems due to the freeze.
- Steel pipes must always be of the plated.
- Before installing an actuator in pipeline, flash the inside of pipeline completely.
- Threaded area of a pipe must be free from the sharp edges and burr.

Necessary items

- Spanner wrench
- Steel pipe or tube for piping
- Seal tape
- Joint for steel pipe or tube

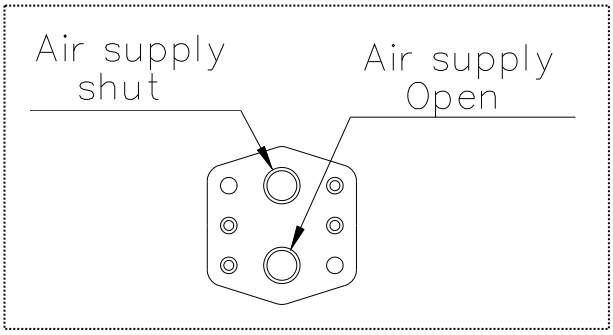
Procedure

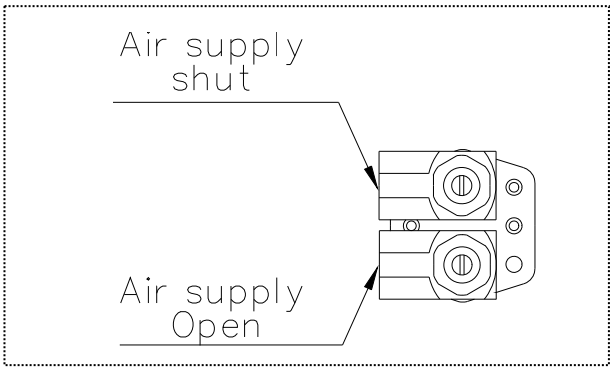
1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.

2) Screw the joint in the piping female screw of the actuator by hand to the full.

3) Screw the joint one turn with a spanner wrench.
* Avoid excessive tightening.
(The valve can be damaged.)

4) Mount a steel pipe or a tube.





<2> For a pressure reducing valve with a solenoid valve and a pressure reducing valve with a filter.

Caution
- Do not remove a dust-proof cap provided to piping port before piping work starts.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- Do not apply a sealant excessively lest it fall off in the pipeline when an actuator is piped.
- Steel pipes must always be of the plated.
- Before installing an actuator in pipeline, flash the inside of pipeline completely.
- Threaded area of a pipe must be free from the sharp edges and burr.
- Avoid excessive tightening. (The threaded area of a pipe can be damaged.)
- Solenoid valve-A speed controller adjusts and fasten a lock nut by open ended spanners.
- Open the drain periodically in order to exhaust the deposit.
- The equipment must be used at a pressure below the maximum operating pressure specified for the product.

Necessary items
- Spanner wrench
- Steel pipe or tube for piping
- Seal tape
- Joint for steel pipe or tube

Procedure

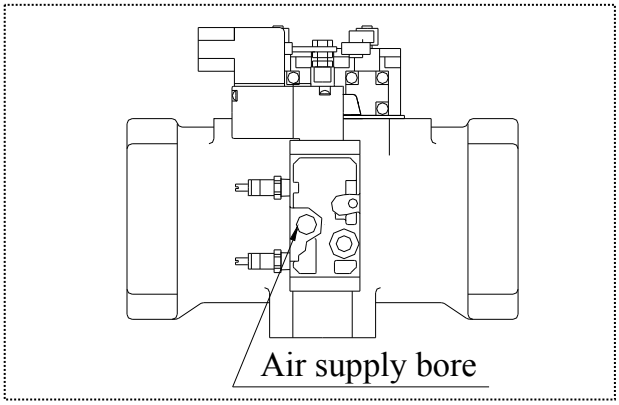
1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.

2) Screw the joint in the piping female screw of the actuator by hand fully.

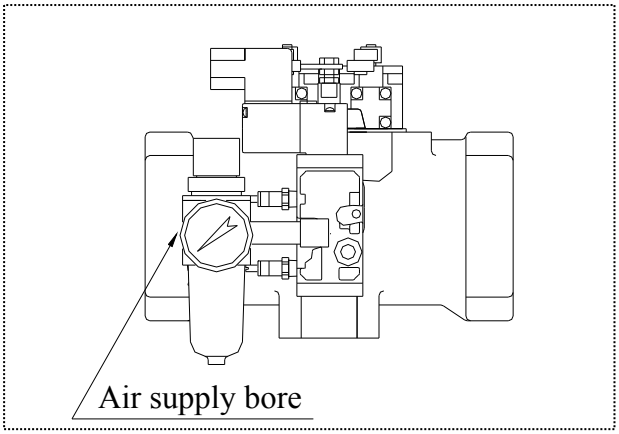
3) Screw the joint one turn with a spanner wrench.
*Avoid excessive tightening.
(The valve can be damaged.)

4) Mount a steel pipe or a tube.

(Fig.2) Solenoid valve



(Fig.3) Solenoid valve, Pressure reducing valve with filter



(15) Connection of limit switch procedure

<1LS1-J>

Warning - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.

Caution - Be sure that the cover are put on during the operation.

- Connect the cables by using insulated sheathed crimping terminals in such a way as not to contact the cover or housing. (Contact of a crimping terminal with the cover may disable the cover from being closed or may cause a ground fault.)
- If you use the limit switch at 1mA-100mA or 5-30V, consult near Asahi dealer.
- Be sure that the terminal cover and body cover are put on during the operation.

Necessary items

- Screw driver (+)
- connector (G1/2)
- Crimp-style terminal
- Wire stripper
- Terminal crimping tool

Procedure

1) Loosen three screws used to attach the limit switch cover with a Phillips head screwdriver and remove the cover from limit switch.
(The screw is made so that it will not detach from the cover.)

2) Pull and remove protective cap, made of resin, from the cover.

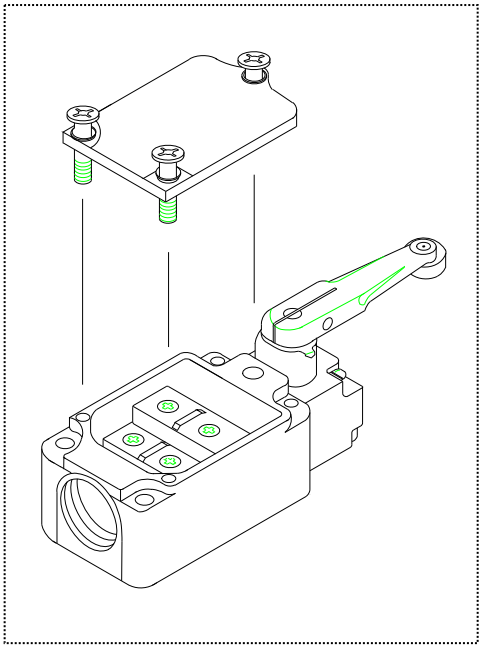
3) Draw a cable through the connector.

4) Strip cable with wire stripper.

5) Install a crimp-style terminal on the lead wire with a terminal crimping tool.

6) Connect terminal screw with a Phillips head screwdriver according to the internal circuit diagram shown in page8.
* Tighten up the screw.
(If not, electric leaks or shocks may occur.)

7) Tighten the above three screws with a Phillips head screwdriver to install cover on the limit switch.



Warning - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.

Caution - Be sure that the cover are put on during the operation.

Necessary items

- Screw driver (+)
- Screw driver (－)
- connector (G1/2)
- Wire stripper

手　順

1) Loosen four screws used to attach the limit switch cover with a Phillips head screwdriver and remove the cover from limit switch.
(The screw is made so that it will not detach from the cover.)

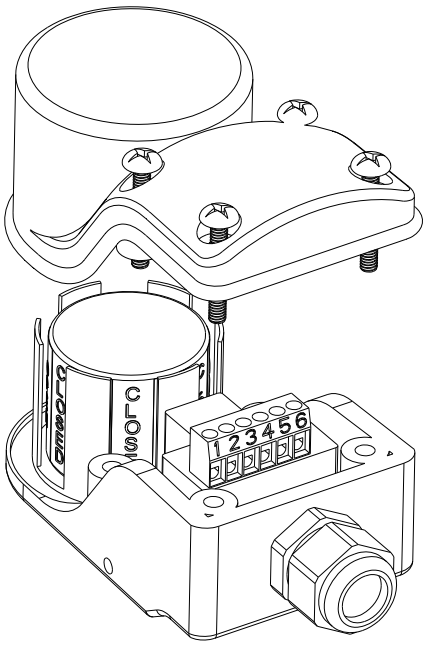
2) Remove a protective cover made of resin.

3) Draw a cable through the connector.

4) Strip cable with wire stripper.

5) Connect terminal screw with a flat head screwdriver according to the internal circuit diagram shown in page8.
* Tighten up the screw.
(If not, electric leaks or shocks may occur.)

6) Tighten the above four screws with a Phillips head screwdriver to install cover on the limit switch.



(16) Connection of solenoid valve procedure

Caution

- Go after you surely interrupt a power supply when you do the installation of the terminal base line is combined.
- Solenoid valve- A speed controller adjusts and fasten a lock nut by open ended spanners.

Necessary items

- Terminal crimping tool
- Connector (G1/2)
- Screw driver (+)
- Wire stripper

Procedure

1) Loosen the hexagon socket head cap screws, and remove the cover.
   * Don't loose O-ring.
   (If not, electric leaks or shocks may occur.)

2) Remove the Faston terminal inserted into coil side and the insulating sleeve.
   * Insulating sleeve isn't attached in Faston terminal.

3) Draw the cable through the connector to the cover.

4) Strip the cable with wire stripper.

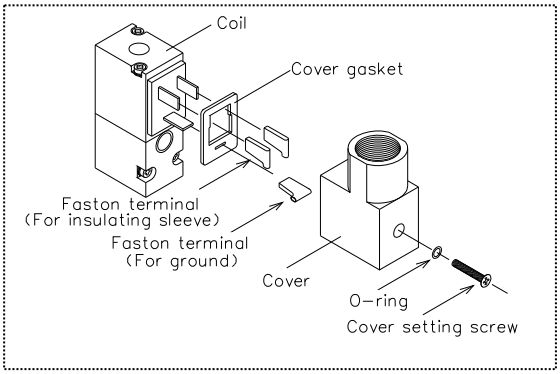
5) Draw the lead wire through the cover.

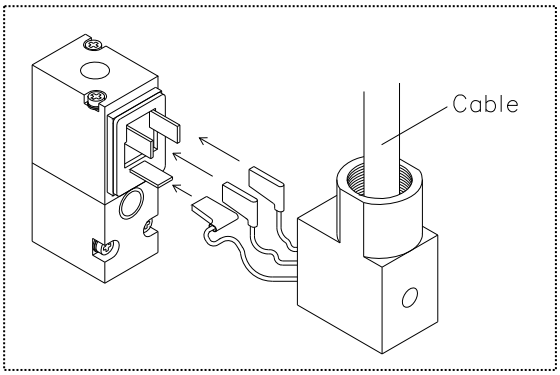
6) Install the Faston terminal on the lead wire with a terminal-crimping tool.

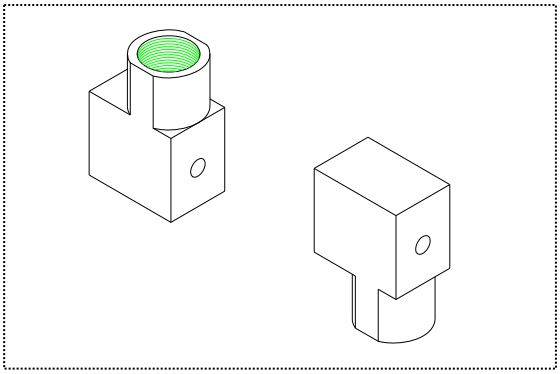
7) Insert the Faston terminal into the coil side. And fit the cover.

8) Tighten the cover setting screws to fix it.
   The cover can be set with the wire extraction opening turned upward or downward.

9) Tighten the cable by connector.







(17) Operating procedure

Manual Operating Procedure

○Double action type

Warning - Don't supply air during manual operation.
(When air is supplied during the manual operation, you may be injured.)

Caution - In case of solenoid valve mounted, open the bypass valve to make atmospheric pressure in the actuator.
(It can't do Manual operation.)

Necessary items
- Spanner wrench

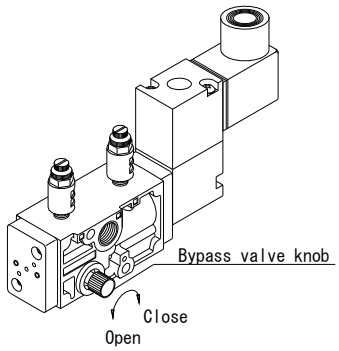
Procedure

1) Attach the spanner wrench to the output shaft in the upper part of the actuator, and turn the handle 1-2 times between full open and full close.

Right turn (clock wise) → Close direction
Left turn (counter clock wise) → Open direction

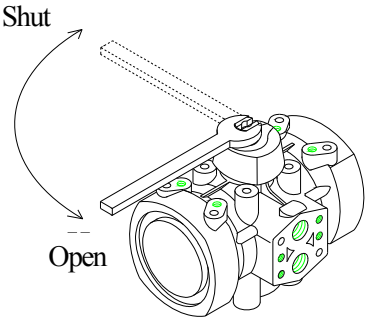
* Do not turn the handle forcibly at the right and left full operating positions.
(If not, a trouble will develop.)

For solenoid valve



2) Set the valve in the fully-opened of fully-closed position, and remove the spanner wrench from the output shaft in the upper part of the actuator.

* In case of solenoid valve mounted, shut the bypass valve.
(If not, a trouble will develop.)



Automatic (Air) Operating Procedure

Warning - Make sure that the spanner is not attached to the output shaft in the upper part of the actuator securely.
(If not, the spanner will be flown by the rotation of the output shaft and the spanner may injure you.)

Caution - Keep air supply pressure from a compressor at least 0.4 MPa (4.1kgf/cm2), and at the maximum 0.8MPa (8.2kgf/cm2).

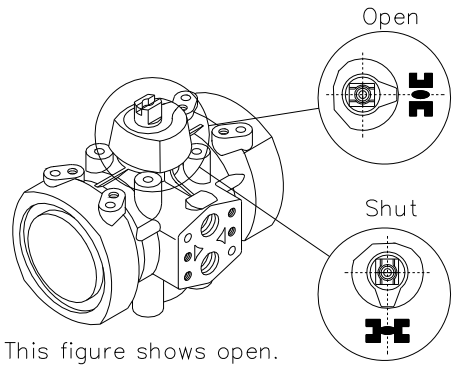
Procedure

1) Supply the air to the air supply opening.

2) Check that the valve indicating direction and the operating direction agree with each other.

3) Stop supplying air.

Opening indicator



<For the solenoid valve >

Procedure

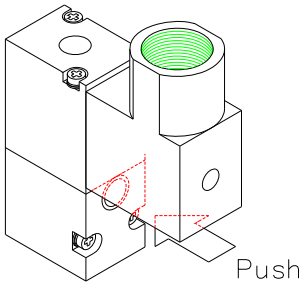
1) Supply the air to the solenoid valve.

2) Push the button (fig.5) with a finger, and confirm the action mode shown in the following table.

3) Apply regular rated voltage to the solenoid valve, and confirm the action mode shown in the following table.

4) Turn off the solenoid valve

Fig.5



Push button	Current	Double action Air to open	Air to shut
Pushed	On	Open	Shut
Not pushed	Off	Shut	Open

Adjustment of opening / closing speed procedure

Warning - Solenoid valve: A speed controller adjusts and fastens a lock nut by open ended spanners.

○Double action type

Necessary items
- Spanner wrench

Procedure

1) Release the adjustment knob of the solenoid valve by turning the locking nut left with a spanner, holding the two adjustment knobs (open side and close side) of the speed controller with fingers.

2) Turn right the adjustment knob of the solenoid valve fully.
* Avoid excessive tightening.
(The speed controller can be damaged.)

3) Supply the air to the solenoid valve.

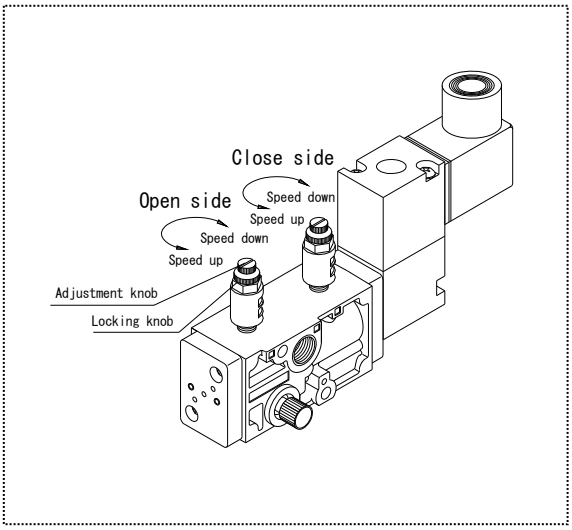
4) Apply regular rated voltage to solenoid valve, and turn left the open side adjustment knob little by little.

5) Turn off the solenoid valve, and turn left the close side adjustment knob little by little.

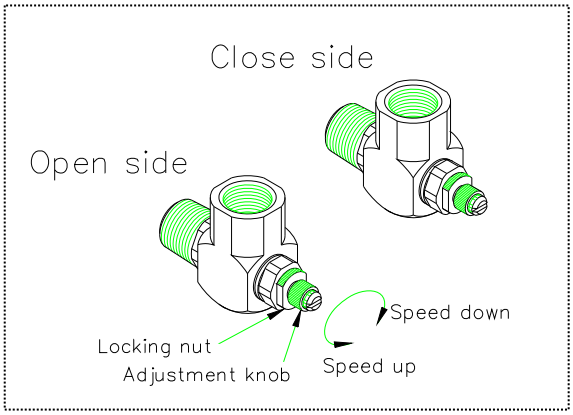
6) Repeat item 4), 5) to adjust the opening / closing speed required.

7) When the adjustment is finished, fix the adjustment knob by turning locking nuts right with a spanner, holding the adjustment knobs with fingers.
* Avoid excessive tightening.
(The locking nut can be damaged.)

For Double action type with solenoid valve



For Double action type with speed controller



○ Single action type

Necessary items
● Spanner wrench

The actuation type changes the speed-adjustable direction.

Single action	Opening speed	Closing speed
Air to open type	Not adjustable	Adjustable
Air to shut type	Adjustable	Not adjustable

Procedure

1) Release the adjustment knob of the solenoid valve by turning the locking nut left with a spanner, holding the adjustment of the speed controller with fingers.

2) Turn right the adjustment knob of the solenoid valve fully.
* Avoid excessive tightening.
(The speed controller can be damaged.)

3) Supply the air to the solenoid valve.

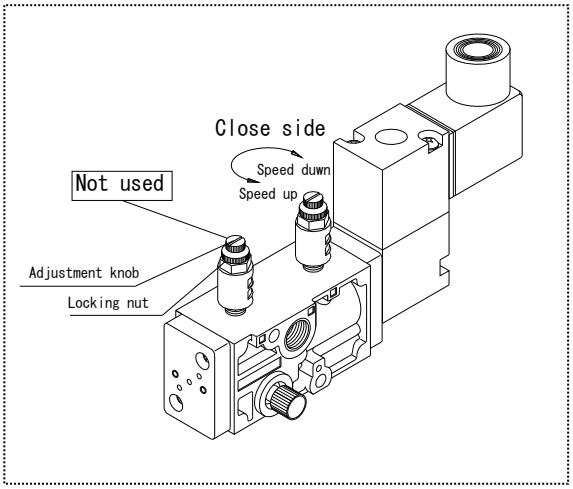
4) Apply regular rated voltage to solenoid valve, turn left the open side adjustment knob little by little.

5) Turn off the solenoid valve, and turn left the close side adjustment knob little by little.

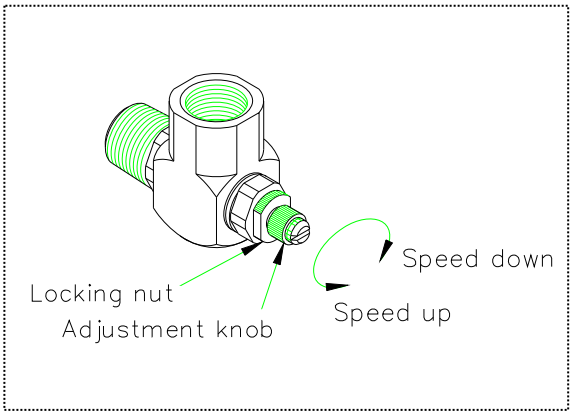
6) Repeat item 4), 5) to adjust the opening / closing speed required.

7) When the adjustment is finished, fix the adjustment knob with locking nuts.
* Avoid excessive tightening.
(The locking nut can be damaged.)

For Single action type with solenoid valve



For Single action type with speed controller



(18) Mounting inserted metal (ensat) and base (panel)

Warning - When screwing in a Metal Insert (Ensat), install it vertically. Refer to the User's Manual for Metal Insert (Ensat) by the Maker.

Fixation of bottom stand with panel

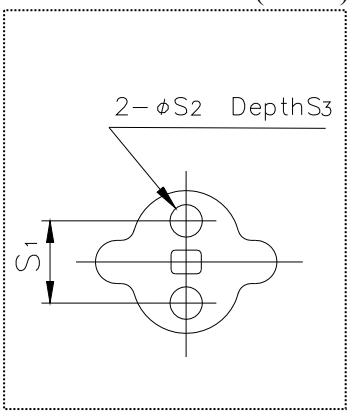
Procedure

Refer to the user's manual for the Ensat (metal insert) (Commercially available).

Bottom stand dimension Unit; mm (inch)

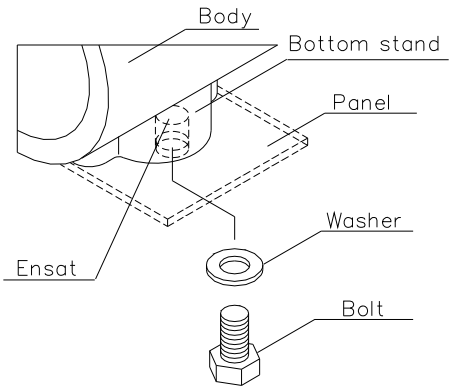
Nom. Size	S_1	S_2	S_3
15-25mm (1/2"-1")	19 (0.75)	7.3 (0.29)	11 (0.43)
32-50mm (1 1/4"-2")	30 (1.18)	9 (0.35)	15 (0.59)

Nominal size 15-50mm (1/2"-2")

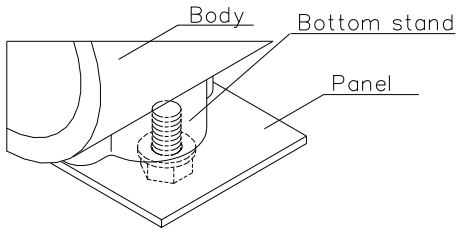


Fixation of bottom stand with panel

Before fixation



After fixation



(19) Method of adjusting face pressure between ball and seat

Warning - Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)

Caution - Take care not to over-tighten the Union Nut. (The valve can be damaged.)

- Do not use the pipe wrench. (The valve can be damaged.)

Necessary items

- Strap wrench
- Handle (For manual operating Option:[14])
- Protective gloves
- Allen wrench
- Safety goggles

Procedure

1) Completely discharge fluid from pipes.

2) Shut the main air valve, and open the bypass valve to discharge air from the actuator.

3) Turn off the power source of solenoid valve. (In the case of solenoid valve mounted.)

4) Loosen the two unions nuts [5] at night and left with an strap wrench.

5) Remove the body part from piping system.

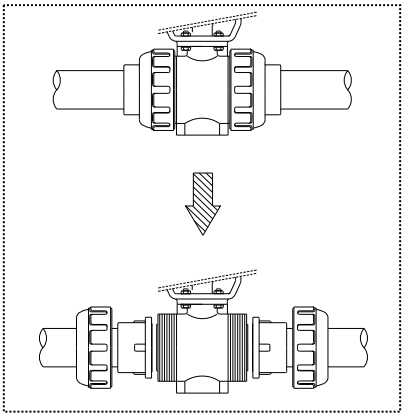
6) Loosen bolt (B) [27] with a spanner wrench, and remove the body part.
* Memorize both opening degree of boll [2] and actuator [23].

7) Operate the valve to full close.
* Except for spring single action type.

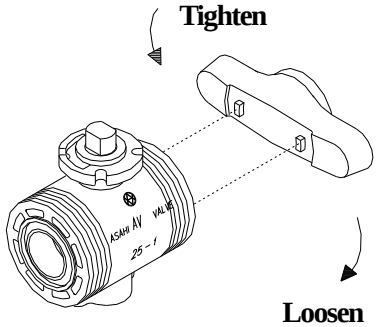
8) Engage the upper convex part of the handle with the concave part of the union.

9) Make an adjustment by turning the union clockwise or counter clockwise.
-Tighten the union
Ball valve type 21: Clockwise
Ball valve type 21α: Counter clockwise
-Loosen the union
Ball valve type 21: Counter clockwise
Ball valve type 21α: Clockwise

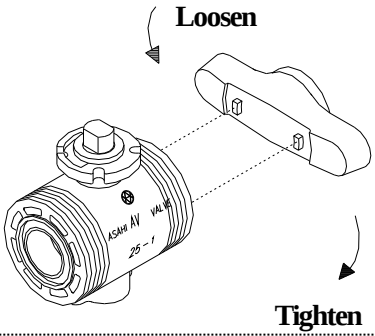
10) Assemble the valve by following the above procedure in the reverse order, starting at 6).



Ball valve **type 21**



Ball valve **type 21α**



(20) Disassembling method for replacing parts

Warning - Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)

Caution - Take care not to over-tighten the Union Nut. (The valve can be damaged.)

- Do not use the pipe wrench. (The valve can be damaged.)

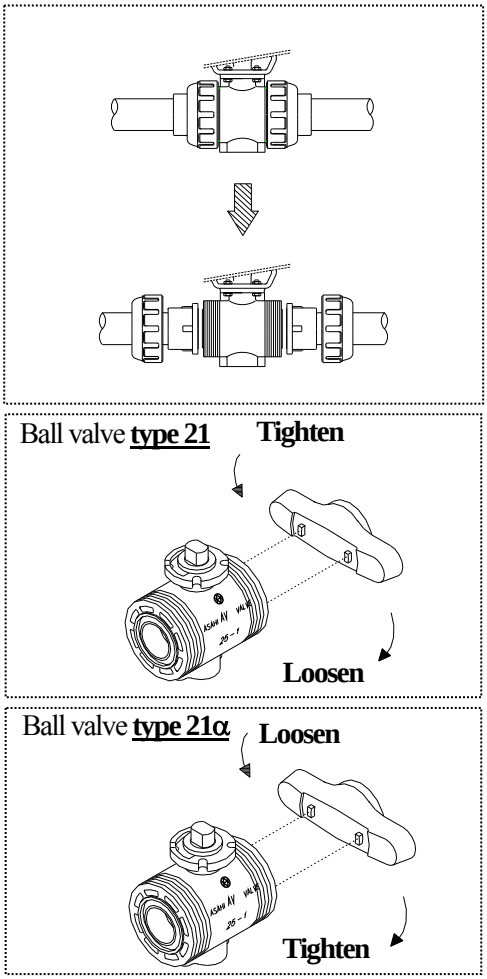
- Type 21 & Type 21 Alpha has not all same parts to make one complete. Please check and specify the model from the valve overview.

Necessary items

- Strap wrench
- Allen wrench
- Handle (For manual operating Option : [14])
- Safety goggles
- Protective gloves
- Spanner wrench

<Disassembly> Procedure

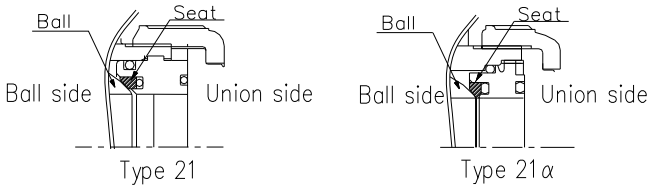
1) Completely discharge fluid from pipes.
2) Shut the main air valve, and open the bypass valve to discharge air from the actuator.
3) Turn off the power source of solenoid valve. (Only solenoid valve)
4) Loosen the union nuts [5] at right and left with a strap wrench.
5) Remove the body from the piping system.
6) Loosen nut and bolt (B) [27] with a spanner wrench, and remove stand [24] from the top flange.
7) Loosen the bolt (A) [26] between the actuator [23] and the stand and remove the actuator [23].
8) Loosen set screw [28] with an allen wrench, and remove joint [25] from stem [6].
9) Engage the upper convex part of the handle with the concave part of the union [3].
10) In the engaged state, turn the handle to loosen it and remove the union [3].
    -Loosen the union
    Ball valve type 21: Counter clockwise
    Ball valve type 21α: Clockwise
11) Remove the seat [7] carefully by hand without damaging it.
12) Operate the valve to full close.
13) Push out the ball [2] by hand.
14) Push out the stem [6] from the top flange side to the body side.



<Assembly> Procedure

Carry out the assembly work in the reverse procedure from item 14)

Caution - With regard to item 11), before installing seat [7] on the valve, check the seat for its face and back depression side = engagement with ball (Refer to page 4,5)



(21) Inspection items

Caution - Perform periodic maintenance. (Leakage may develop due to temperature changes or over periods of prolonged storage, rest or operation.)

○Periodically inspect and maintain the AV valve in accordance with the decided schedule.

Portion to be inspected	Inspection item
Actuator	1) Existence of rust, peeling of paint, and dirt of inspection hole of valve travel indicator. 2) Tightening condition of respective threaded portions. (Loose or not) 3) Existence of rust and corrosion around the limit switch, and existence of internal disconnection. 4) Existence of abnormality in opening and closing operating sounds. * It is unnecessary to supply oil to this actuator.
Valve	1) Existence of scratches, cracks, deformation, and discoloring. 2) Existence of leakage from the valve to the outside. 3) Existence of leakage when the valve is closed fully at right or left.

(22) Troubleshooting

Problem	Cause	Treatment
The handle is not (can't be) turned when the valve is operated manually.	The valve has already been opened fully.	Turn the handle in the reverse direction.
	The air is supplied to actuator.	Shut the main air valve, and open the bypass valve.
	Foreign matter is in the valve.	Disassemble the valve to remove foreign matter. (Refer to page 28)
	The torque of the valve is increased by the piping stress.	Remove the piping stress.
	The torque is increased by the influence (temperature, components, pressure) of fluid on the valve.	Check service condition. (Refer to page 6)
The valve does not operate by air operations	The power source of the control panel is turned off.	Turn on the power source.
	The solenoid valve is disconnected.	Check the connection again. (Refer to page 7, 21)
	The supply voltage to the solenoid valve is wrong.	Check voltage with a tester and set specified voltage.
	The voltage to the solenoid valve is low.	
	The bypass valve is opened.	Close the bypass valve.
	The speed controller is turned right excessively.	Turn the adjuster know left.

Problem	Cause	Treatment
The valve does not operate by air operations	Foreign matter is in the valve.	Disassemble the valve to remove foreign matter. (Refer to page 28)
	The torque of the valve is increased by the piping stress.	Remove the piping stress.
	The torque is increased by the influence (temperature, components, pressure) of fluid on the valve.	Check service condition. (Refer to page 5)
Fluid leaks from the valve even when the valve is closed fully.	The carrier is loosened.	Adjust the face pressure between the ball and the seat. (Refer to page 27)
	The seat is worn.	Replace the seat with a new one.
	The seat and ball are scratched.	Replace the scratched seat and ball with new ones.
	Foreign matter is in the valve.	Discharge the foreign matter from the valve by opening and closing the valve several times.
Fluid leaks from the valve.	The union nut is loosened.	Tighten up the union nut.
	The O-ring is scratched or worm.	Replace the O-ring with a new one.
	The O-ring is projected from the groove.	
	The sliding face or the fixed face of the O-ring is scratched or worm.	Replace the sliding face or the fixed face with a new one.
The actuator operates, but the valve is not open or close.	The stem or the joint is broken.	Replace the stem or the joint with a new one.
	The engagement between the stem and the ball is broken.	Replace the engagement with a new one.

(23) Handling of residual and waste materials

Warning

- Make sure to consult a waste treatment dealer for recommendations on the proper disposal of plastic valves. (Poisonous gas is generated when the valve is burned improperly.)

Ball Valves Type 21・21α

Pneumatic Actuated Type AA

[Automatic Valve]

ASAHI *AV* VALVES

Asahi Organic Chemicals Industry's homepage http://www.asahi-yukizai.co.jp/en/

Information in this manual is subject to change without notice. 2014.3